

EXHIBIT 14

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

Claim 1	Accused Hotspot Devices ¹	Accused RAN Products ²
[1PRE] A broadband wireless repeater or relay, comprising:	<p>Accused Hotspot Devices, such as smartphones, (e.g., Galaxy S20-S25, Galaxy Z Flip 3-6, Galaxy Z Fold 2-6, Galaxy Note 20 Ultra, and Galaxy Series A smartphones), tablets (e.g., Galaxy Tab S series tablets), Hospitality TVs (e.g., NJ670, NT670, NJ678, NT678, NJ690, NT690, NC890, HQ60A), and smart hub devices (e.g., SmartThings Wifi, SmartThings Hub, Connect Home, Connect Home Pro), can serve as a broadband wireless repeater when in a mode to operate as a mobile hotspot. So configured, the Accused Hotspot Devices connect one or more mobile devices via a Wi-Fi network to the Internet or via a cellular network to the Internet.</p> <p>See Samsung website (www.samsung.com/us/support/answer/ANS00079036/) explaining how to use a mobile hotspot on a Galaxy phone or tablet.</p>	<p>Accused RAN Products (e.g., Massive MIMO Radios, CBRS radios, Compact Macros, and Link Cells) act as a wireless repeater to broadcast received wireless signals to connected devices via, for example, a 5G cellular network, and to receive and forward wireless signals received from the connected devices to the Internet via a 5G cellular network.</p> <p>Massive MIMO Radio: see www.samsung.com/global/business/networks/products/radio-access/massive-mimo-radio/</p> <p>Citizens Broadband Radio Service (CBRS) Radios enable communication of 150MHz of shared spectrum in Band 48 (otherwise known as the 3.5GHz C-Band). See https://insights.samsung.com/2022/11/04/what-is-cbrs-and-how-is-it-transforming-enterprise-networks-2/ and https://www.samsung.com/global/business/networks/products/radio-access/cbirs/</p>

¹ Upon information and belief, all Accused Hotspot Devices function in a substantially similar manner for the relevant accused functionality.

² Upon information and belief, all Accused RAN Products function in a substantially similar manner for the relevant accused functionality.

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	 <p>SAMSUNG Shop Mobile TV & Audio Appliances Computing Displays Accessories SmartThings Explore Support For Business</p> <p>Use a mobile hotspot on your Galaxy phone or tablet</p> <p>Mobile Hotspot On</p> <p>JOHNNY's Galaxy S21 Ultra 5G</p> <p>175.0000</p> <p>2.4 GHz</p>	<p>Compact Macro: See networks.insights/brochures/1221-5g-fixed-wireless-access-a-powerful-alternative-to-fiber-to-the-home/5g-fixed-wireless-access-a-powerful-alternative-to-fiber-to-the-home.pdf</p> <p>5G Link Cell: see images.samsung.com/is/content/samsung/assets/global/business/networks/insights/white-papers/bringing-5g-indoors-the-critical-next-step-in-5gs-evolution/Samsung-Link-Series.pdf</p>  <p>Massive MIMO Radio for rooftop and tower</p> <p>Compact Macro for roadside</p> <p>Link Cell for indoor</p>
<p>[1A] at least one receiver or transceiver for signal or data reception from one or more devices;</p>	<p>The Accused Hotspot Devices include a receiver or transceiver for signal or data reception from a device (“connected device”) that is connected wirelessly to the Accused Hotspot via WiFi5, WiFi6 or WiFi6E.</p>	<p>The Accused RAN Products include radio chipsets, which comprise at least one receiver or transceiver for signal or data reception from a connected device.</p> <p>See www.samsung.com/global/business/networks/insights/brochures/1221-5g-fixed-wireless-access-a-powerful-alternative-to-fiber-to-the-home/5g-fixed-wireless-access-a-powerful-alternative-to-fiber-to-the-home.pdf</p>

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

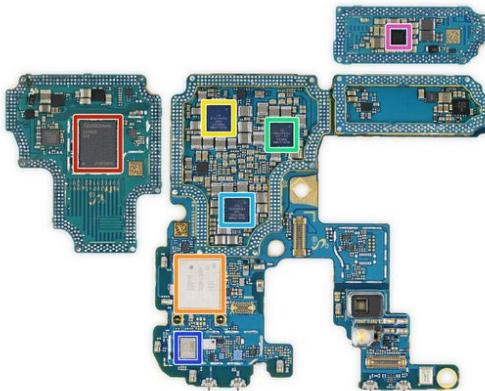
	<p>The “at least one receiver” comprises the WiFi receiver of the Accused Hotspots.</p> <p>Below is an image of a Galaxy S20 Ultra circuit board, showing in the orange rectangle, a Murata KM9D19075 Wi-Fi module, which comprises “at least one receiver or transceiver for signal or data reception from one or more devices.” See www.ifixit.com/Teardown/Samsung+Galaxy+S20+Ultra+Teardown/131607?srsltid=AfmBOorbKmG1FgZYkgqQsKc3mMYaHd6vA_c9nDDoDhWlkT_IkjIhRT-t</p>  <p>As another example, below is an image of a Galaxy S22 Ultra circuit board a Broadcom Wi-Fi 6/6E chip, which comprises “at least one receiver or transceiver for signal or data reception from one or more devices.” See https://www.samsung.com/press-releases/2021/samsung-unveils-new-chipsets-to-enhance-next-generation-5g-ran-portfolio/</p>	
--	---	--

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>www.techinsights.com/blog/samsung-galaxy-s22-ultra-teardown</p>  <p>Samsung's website describes the specification of the HQ60A series hospitality TVs as including a software access point (SoftAP). The SoftAP feature allows the Hospitality TV to deploy hotspot for the hotel guests to connect to the internet.</p>	
--	--	--

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>Samsung LYNK™ Cloud Yes</p> <p>Hospitality Plug&Play (Easy Set-up) Yes</p> <p>Hotel Channel List Yes</p> <p>Mixed Channel List (ATSC, DVB-T/T2/C/S2, Analog) Yes</p> <p>Energy Saving Mode (BLU Control) Yes</p> <p>Clock Back Up Supply Yes</p> <p>Soft AP Yes</p> <p>Samsung LYNK™ DRM Yes</p> <p>Security Mode Yes</p>	
--	---	--

See

<https://www.samsung.com/ca/business/commercial-tvs/hotel-tv/hq60a-4k-qled-hg65q60aanfxza/>

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>As shown in the image below, Samsung's website describes the specifications of the HQ60A Series Hospitality TV as supporting the WiFi5 generation (i.e, IEEE 802.11ac). According to IEEE 802.11ac, the Accused Hotspot Device supports a channel width of up to 160 MHz and data transmission speeds of up to 6.93 Gbps.</p> <table border="1" data-bbox="730 502 1322 1241"><tr><td>USB</td></tr><tr><td>2 x USB-A</td></tr><tr><td> </td></tr><tr><td>Digital Audio Out (Optical)</td></tr><tr><td>1</td></tr><tr><td> </td></tr><tr><td>Ex-Link (Supports RS-232C Gender)</td></tr><tr><td>Supports Stereo Jack to RS232 Adapter</td></tr><tr><td> </td></tr><tr><td>Wifi</td></tr><tr><td>Yes (WiFi5)</td></tr><tr><td> </td></tr><tr><td>Variable Audio Out</td></tr><tr><td>Yes</td></tr><tr><td> </td></tr><tr><td>RJ12 (Side/Rear)</td></tr><tr><td>Yes</td></tr></table> <p>See <i>id.</i></p> <p>In another example, the Accused Hotspot Devices (Connect Home Pro) can connect a user mobile device to other smart devices</p>	USB	2 x USB-A	 	Digital Audio Out (Optical)	1	 	Ex-Link (Supports RS-232C Gender)	Supports Stereo Jack to RS232 Adapter	 	Wifi	Yes (WiFi5)	 	Variable Audio Out	Yes	 	RJ12 (Side/Rear)	Yes	
USB																			
2 x USB-A																			
Digital Audio Out (Optical)																			
1																			
Ex-Link (Supports RS-232C Gender)																			
Supports Stereo Jack to RS232 Adapter																			
Wifi																			
Yes (WiFi5)																			
Variable Audio Out																			
Yes																			
RJ12 (Side/Rear)																			
Yes																			

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>through a Wi-Fi network. This allows the Accused Hotspot Devices to send and receive wireless data over a Wi-Fi network.</p> <p>See</p> <p>https://content.syndigo.com/asset/17adf894-afac-49a6-9e43-acc47d706188/original.pdf</p> <p>About SAMSUNG Connect Home (Pro)</p> <p>The Samsung Connect Home (Pro) is a Wi-Fi router that can connect your smartphone to your smart home appliances via Wi-Fi. You can also connect Internet of Things (IoT) devices to this Wi-Fi hub via the Samsung SmartThings Hub feature.</p> <p>For larger homes, you can connect more Wi-Fi hubs.</p> 	
[1B] at least one transmitter or transceiver for signal or data transmission to one or more devices, wherein the transceiver for signal or data reception and the transceiver for signal or data transmission may be the same or different; and	<p>The Wi-Fi modules in the Accused Hotspot Devices comprise a transmitter or transceiver for signal or data transmission to the connected device, e.g., data received via the Accused Hotspot's 4G LTE or 5G connection, to the connected device.</p> <p>The Accused Hotspot Devices also include cellular (e.g., 4G LTE or 5G) modems for transmitting signals via a cellular network. For example, the S20 Ultra includes a Qualcomm SDX55M 2nd-gen 5G modem and the S22 Ultra includes a Samsung Exynos 2200 Application Processor and Modem.</p> <p>See</p> <p>https://www.ifixit.com/Teardown/Samsung+Galaxy+S20+Ultra+Teardown/131607?srsltid=A</p>	The radio chipsets in the Accused RAN Products include comprise at least one transmitter or transceiver for signal or data transmission to the connected device.

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>fmBOopOTcIPFaJiIRUPiDep9- XATBYRH6xkMpaedF27wAPov8Js8KhL and <u>https://www.techinsights.com/blog/samsung-galaxy-s22-ultra-teardown</u> In one example, the transmitted data is data that is received via the Accused Hotspot Device's 4G LTE or 5G network connection, and transmitted to the connected device (e.g., mobile user device). In another example, the image below shows that an Accused Hotspot Device (Q60A hospitality TV) uses at least a transmitter/receiver or a transceiver to establish wireless communication with a guest's mobile device, over WiFi5 generation (i.e., IEEE 802.11ac).</p>	
--	--	--

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>USB 2 x USB-A</p> <p>Digital Audio Out (Optical) 1</p> <p>Ex-Link (Supports RS-232C Gender) Supports Stereo Jack to RS232 Adapter</p> <p>Wifi Yes (WiFi5)</p> <p>Variable Audio Out Yes</p> <p>RJ12 (Side/Rear) Yes</p>	
	<p>see</p> <p>https://www.samsung.com/ca/business/commercial-tvs/hotel-tv/hq60a-4k-qled-hg65q60aanfxza/</p> <p>In another example, the Accused Hotspot Devices (Connect Home Pro) can connect a user mobile device to other smart devices through a Wi-Fi network. This allows the Accused Hotspot Devices to send and receive wireless data over a Wi-Fi network.</p>	

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

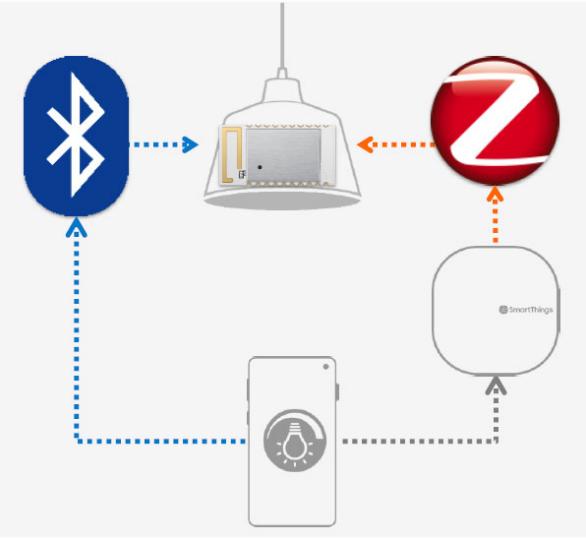
	 <p>See https://download.led.samsung.com/led/file/resource/2020/06/Smart_Lighting_Solution_0602.pdf</p>	
[1C] a controller that is configured or configurable for operation in one or more wireless networks,	<p>The Accused Hotspot Devices comprise a controller that is configurable for operation in both a Wi-Fi network (e.g., WiFi5, WiFi6, or WiFi6E) and a cellular network (e.g., 4G LTE or 5G), which are wireless networks.</p> <p>For example, the Galaxy S20 Ultra comprises, among other things, a STMicroelectronics STM32G071EB 32-bit ARM microcontroller and a Qualcomm SDX55M 5G modem.</p> <p>www.ifixit.com/Teardown/Samsung+Galaxy+S20+Ultra+Teardown/131607?srsltid=AfmBO</p>	<p>A processor in the Accused RAN products is configurable for operation in, for example, a 5G cellular network, which is a wireless network.</p> <p>For example, the processor in the Accused RAN Products can be programmed with an ID for the connected device. The ID can be, for example, the IMEI (International Mobile Equipment Identity) number, the IMSI (International Mobile Subscriber Identity) number, the IP address, and/or the</p>

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>orbKmG1FgZYkgqQsKc3mMYaHd6vA_c9nDDoDhWlkT_IkjIHRT-t</p> <p>In another example, the Galaxy S22 Ultra comprises, among other things, a Samsung RF Transceiver S5520, a Broadcom Front-End Module AFEM-9140, a Skyworks Front-End Module SKY58083-11, a Broadcom Wi-Fi 6/6E&BT 5.0 SoC BCM4389, and a Qorvo Front-End Module QM77098. www.techinsights.com/blog/samsung-galaxy-s22-ultra-teardown</p> <p>Wi-Fi protocols, such as WiFi5, WiFi6 and WiFi6E, use IP and/or MAC addresses to identify connected devices. See e.g., www.techtarget.com/searchnetworking/answer/What-is-the-difference-between-an-IP-address-and-a-physical-address/.</p> <p>The Accused Hotspot Devices utilize WPA2 and/or WPA3 protocols to allow for secure broadcasting of a WiFi hotspot, which employs a handshake sequence that requires identification via network information of devices requesting to join the mobile hotspot. https://insights.samsung.com/2022/12/16/how-to-turn-your-galaxy-smartphone-into-a-hotspot-3/</p> <p>https://en.wikipedia.org/wiki/Wi-Fi_Protected_Access</p> <p>The cellular modem in the Accused Hotspot Devices also configures the Accused Hotspot</p>	<p>MAC address of the connected ultrawideband device.</p> <p>The Accused RAN Products need the connected device's ID in order to communicate with the connected device via 5G.</p> <p>See amit-khandelwal.medium.com/understanding-5g-eab4a660d3ab; interlir.com/2024/08/01/the-impact-of-5g-on-ip-resource-management/</p>
--	--	--

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	<p>Devices for operation in a cellular network (e.g., 4G LTE or 5G).</p> <p>In another example, the image below shows that the Samsung operating system, Tizen, on Hospitality TVs is programmable through a network API to configure the TVs network settings to identify an ultrawideband wireless device.</p> <pre> NetworkManager void removeNetworkChangeListener(Listener listener), DOMString getWIFISsid(); long getWIFISignalStrengthLevel(); NetworkWIFISecurityMode getWIFISecurityMode(); NetworkWiFiEncryptionType getWiFiEncryptionType(); DOMString getSecondaryDns(); void setDhcpOption60Field(DOMString vendorName); void removeDhcpOption60Field(); DOMString getCurrentDhcpOption60Field(); DOMString checkCurrentDhcpOption60Field(); void enableSoftAP(); void disableSoftAP(); boolean isSoftAPEnabled(); DOMString getSoftAPSSID(); void setSoftAPChannel(long channel); DOMString getSoftAPSecurityKey(); void setSoftAPSignalStrength(unsigned long power); void setEAPCallPath(DOMString path); void setEAPPassphrase(DOMString name, DOMString password); long getWIFIFrequency(); </pre> <p>See https://developer.samsung.com/smarttv/development/api-references/samsung-product-api-references/network-api.html</p>	
<p>[1D] said controller communicating with said at least one receiver or transceiver for signal or data reception and said at least one transmitter or transceiver for signal or data transmission,</p>	<p>The controller in the Accused Hotspot Devices communicates with the receiver and transceiver of the Wi-Fi module and the cellular modem for data reception and transmission via Wi-Fi and cellular networks.</p>	<p>The controller in the Accused RAN Products communicates with the receiver and transceiver thereof for 5G data reception and transmission.</p>

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

<p>[1E] wherein at least one of said receiver or transceiver for signal or data reception and said transmitter or transceiver for signal or data transmission either or both transmit and receive at an instantaneous or overall occupied bandwidth of 100 MHz or more or have a data transmission rate of 100 Megabits per second or more,</p>	<p>WiFi5, WiFi6 and WiFi6E have channels with an instantaneous or overall occupied bandwidth of 100 MHz or more. For example, WiFi5, WiFi6 and WiFi6E have channels with bandwidth of 160 MHz.</p> <p>See e.g., help.keenetic.com/hc/en-us/articles/360012060379-Available-channels-on-the-5-GHz-Wireless-network</p> <p>and</p> <p>help.keenetic.com/hc/en-us/articles/360010536300-What-you-need-to-know-about-Wi-Fi-6-IEEE-802-11ax</p> <p>The Accused Hotspot Devices also communicate via 4G LTE or 5G cellular networks, which have channels with an instantaneous or overall occupied bandwidth of 100 MHz or more.</p> <p>Aggregated 4G-LTE carrier channels, such as aggregated Band 41 channels, have a bandwidth of 100 MHz or more.</p> <p>5G has several bands (including but not limited band n41, n48, n77, n78, n79, n90, n257, n258, n259, n260, n261) that have bandwidths of 100 MHz or more.</p>	<p>The Accused RAN Products operate at 5G, which has NR bands that have a bandwidth of 100 MHz or more (e.g., n41, n48, n77, n78, n79, n90, n257, n258, n259, n260, n261 bands).</p> <p>As described on Samsung's website, the Accused RAN Products, for CBRS Radios, "operate[s] over the entire CBRS Spectrum of 150MHz and can simultaneously transmit a combination of contiguous or non-contiguous 10 or 20MHz carriers, across the entire CBRS Band for both PAL and GAA, up to 100MHz."</p> <p>Expediting Powerful CBRS Service</p> <p>Samsung's CBRS solutions provides simultaneous support of LTE and 5G. For operators who want to operate a LTE network, our solution provides a simple software upgrade path for smooth migration to 5G NR for additional performance growth. Samsung's CBRS Massive MIMO macro radio is an essential solution that supports high speed, wide bandwidth and massive data capacity. The product operates over the entire CBRS Spectrum of 150MHz and can simultaneously transmit a combination of contiguous or non-contiguous 10 or 20MHz carriers, across the entire CBRS Band for both PAL and GAA, up to 100MHz. This is an unmatched quality by other commercial solutions. The Massive MIMO Radio also uses a large number of antenna elements that create multiple beams to precisely target devices and supports MU-MIMO (multi-user MIMO) that increase user throughput by minimizing interference. Even with powerful performance, the product has a slim design with rounded sides and is lightweight so that it can blend in easily with the surrounding environment after installation.</p> <p>See</p> <p>https://www.samsung.com/global/business/networks/products/radio-access/cbtrs/</p>
<p>[1F] wherein said controller is configured or configurable to perform or for performing a plurality of:</p> <p>a) ignore or filter out at least some signal or data transmissions from one</p>	<p>The controller in the Accused Hotspot Devices perform at least (a) and (c). It performs (a) by filtering out signals from undesired transmitters based on the ID of the device with which the repeater/relay is in Wi-Fi</p>	<p>The controller in the Accused RAN Products at least (a) filters out signals from undesired transmitters based on the ID of the device with which the repeater/relay communicates.</p>

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

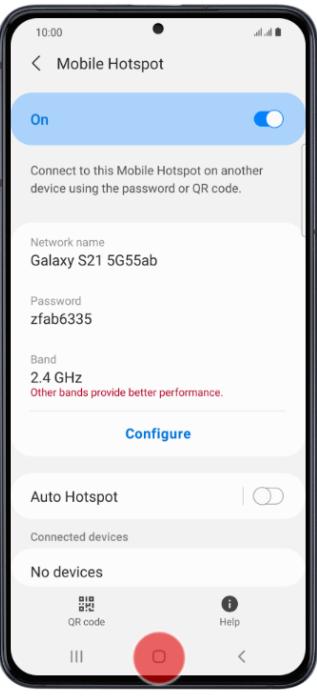
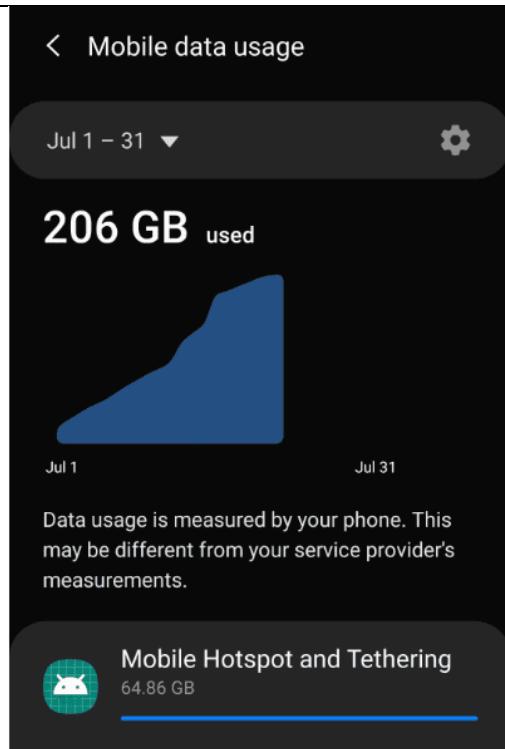
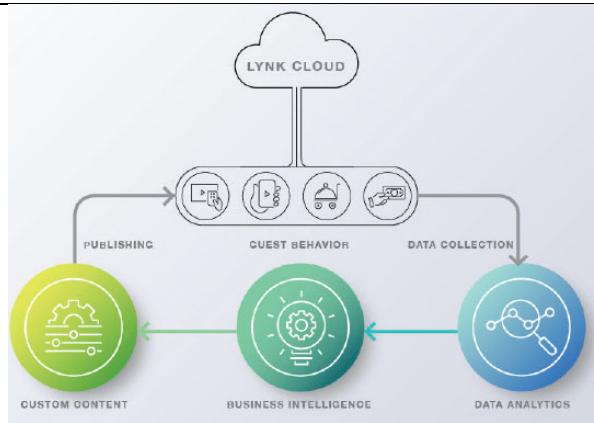
<p>or more undesired transmitters, users, networks, data sources, or noise sources;</p> <p>b) instruct one or more devices or networks to ignore or disregard at least some signal or data transmissions of one or more undesired transmitters, undesired users, undesired networks, or noise sources; and</p> <p>c) network provisioning or monitoring.</p>	<p>communication. It monitors the network (c) by collecting network statistics.</p> <p>For example, the Accused Hotspots show the devices connected to the Wi-Fi network provided by the mobile hotspot. See e.g., devices.vodafone.com.au/samsung/galaxy-s21-5g-android-11-0/connectivity/use-your-phone-as-wi-fi-hotspot/</p>  <p>The Accused Hotspots also track data usage when acting as a mobile hotspot. See gadgetmates.com/check-how-much-hotspot-bandwidth-you-have-left-on-android</p>	<p>The controller in the Accused RAN Products at least (c) monitors the network, such as by adaptively improving beamforming based on users. See brochures/0804_samsungs-massive-mimo-radios-for-an-outstanding-5g-experience/0804_samsungs-massive-mimo-radios-for-an-outstanding-5g-experience_r2.pdf. To adaptively beamform, the Accused RAN Products need to know where users are located, which is an example of network monitoring.</p>
--	---	--

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754



See https://4041669.fs1.hubspotusercontent-na1.net/hubfs/4041669/00_BlueStar%20Microsite%20Files/Samsung/PDF/HQ60A_SERIES.pdf

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754



The Accused Hotspot Devices utilize, for example, the WPA2 or WPA3 protocols, which are network security protocols that screen undesired data to ensure network security and provides network management via preventing undesired connections from other devices.

For example, the Samsung developer documentation, for the Tizen Operating system, states “[t]he SoftAP module allows a device to act as a Soft Access Point (SoftAP), enabling other devices to connect to the network it creates. Applications can use this module to configure and monitor the SoftAP’s status, manage network connectivity, and adjust security settings. It is primarily used in IoT environments to easily set up and maintain network access points.”

See

EXHIBIT 14 – CLAIM CHART FOR U.S. PATENT 8,923,754

	https://docs.tizen.org/application/native/api/common/latest/group__CAPI__NETWORK__SOFTAP__MODULE.html	
Claim 14	Accused Hotspot Devices	Accused RAN Products
[14] The broadband wireless repeater or relay of claim 1, wherein said repeater or relay employs MIMO or adaptive antenna technology.	The Accused Hotspot Devices use MIMO technology for both cellular and Wi-Fi connections. See e.g., https://r2.community.samsung.com/t5/Tech-Talk/What-is-4-4-MIMO-and-Does-My-Smartphone-Need-It/td-p/4938055 ;	At least the Massive MIMO Radios use MIMO technology. See www.samsung.com/global/business/networks/products/radio-access/massive-mimo-radio/